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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09 904,839	07/16/2001	Shigeki Tanaka	501.35250CX3	2815

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EXAMINER

FARAHANI, DANA

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/904,839

Applicant(s)

TANAKA ET AL.

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 3/6/03.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1 ☐ Certified copies of the priority documents have been received.
- 2 ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-10, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al., hereinafter Ishikawa (U.S. Patent 5,907,190) in view of the Japanese patent 59105349 (Document ID#), issued to Mori et al., all previously cited.

Regarding claims 1, 7, and 12, Ishikawa discloses in figure 1 a semiconductor device, shown in the figure, comprising a substrate 1; a semiconductor chip 2 mounted on one surface of the substrate and having bonding pads 3; a plurality of conductors 5 surrounding the chip; bonding wires 4 electrically connecting the bonding pads 3 with conductors 5; and a resin body 7 sealing the chip, the conductors, and the wires.

Ishikawa does not disclose a pitch between adjacent bonding pads increases in a direction toward four corners defined by the four sides of the main surface of the chip. Furthermore, Ishikawa does not expressly disclose the chip has a quadrilateral shape and wires along the four sides.

The Japanese patent discloses in figures 1 and 3, a quadrilateral shaped chip, "a" of figure 1, and wires along its four sides; and the pitch between adjacent bonding pads d1-d13 of figure 3 increases in a direction toward four corners defined by the four

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sides of the main surface of chip a. The Japanese patent also discloses such arrangement enables each wire interval becoming constant (see the abstract, last paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to increase the pitch between bond pads toward the corner of the chip in Ishikawa's invention in order to have constant wire (conductor) intervals.

Regarding claims 2 and 3, the Japanese patent discloses in the last paragraph of the abstract that based on an optimum value, which is determined by successive approximation with a computer, the increasing intervals are determined. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the pitch (increasing intervals) in order to have more exact constant wire intervals.

Regarding claims 4, 8, and 13, see Ishikawa, column 4, lines 9-11, wherein it is stated filler 8 is heat distortable.

Regarding claims 5, 9, 10, 14, and 15, Ishikawa does not expressly disclose insulating layer on the surface of the substrate. It is well known in the art to form an insulating layer (glue) on the substrate and beneath the chip on the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use insulating glue on the substrate to bond the chip, and the corresponding conductive elements, on the substrate, since it is normally used as a bond means between the chip and the substrate.

3. Claims 6, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa in view of the Japanese patent, as applied to claim 1 above, and further in view of Irwin et al., hereinafter Irwin (U.S. Patent 5,627,850), newly cited.

Ishikawa in view of the Japanese patent renders obvious the claimed invention, as above discussed, except for copper being used for the conductors (wires). Irwin teaches that copper is a good thermal and electrical conductor with an advantageously direct bond property. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use copper for the conductors, since copper is a good electrical and conductor.

Response to Arguments

4. Applicants' arguments filed 3/6/03 have been fully considered but they are not persuasive.

Applicants mainly argue, with emphasis, that the Ishikawa reference only discloses cross sectional views and therefore only discloses conductor 5 being arranged with respect to two sides of the chip with bonding pads being disposed along the two sides. Applicants conclude that therefore the reference fails to disclose bonding pads being disposed along the four sides of the main surface of the chip as well as a plurality of conductors being disposed on the one surface of the substrate to surround the semiconductor chip along the four sides thereof. Applicants further argue that with regards to the newly added limitation, namely, the conductors being arranged so as to

extend with one respective end thereof in a radial pattern toward the semiconductor chip.

The examiner notes that the figures in the reference are cross section figures, but these figures, when are accompanied with the whole illustration of the package, are all four sided chip with leads (conductors) radially emanating from the sides of the chip. Therefore, the cross section of the chip, although it shows only two sides of the chip, does not mean that the chip in the reference is a two sided chip. All chips are four sided, and there is no chip that has only two sides, since this implies that the chip is a line shaped chip, which is impossible. Therefore, the chip in the reference is a four sided chip with the leads therein emanated radially from the four sides. In support to this statement, a reference, Bickford et al. (U.S. Patent 5,028,398) is provided with this Office Action. Specifically, note that figure 2 is a cross section of figure 1.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 8:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D. Farahani
May 15, 2003

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